

WHAT IS CLAIMED IS:

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1. A method for providing audio feedback regarding the operation of an aircraft, comprising:
  - receiving audio inputs from a plurality of microphones, wherein the plurality of microphones are disposed adjacent to at least one aircraft component;
  - mixing the audio inputs; and
  - providing an audio output to a speaker in response to the mixing step.

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2. The method of claim 1, further comprising:
  - providing settings to the mixing step, wherein the settings are based on the audio inputs and a psycho-acoustic model.

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3. The method of claim 2, further comprising:
  - determining masked signals based on the frequency and amplitude of the audio inputs and the psycho-acoustic model;
  - determining an unmasking strategy based on the masked signals; and
  - providing the settings based on the unmasking strategy.

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4. The method of claim 1, wherein the speaker is an ambient speaker.

5. The method of claim 1, wherein the speaker is contained in a headset.

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6. The method of claim 2, wherein the settings comprise:
  - at least one of level, pan, and equalization settings.

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7. The method of claim 1, wherein the mixing step is accomplished via an automatic mixer, and further comprising:
  - overriding the automatic mixer with a manual mixer, wherein the manual mixer comprises at least one of level, pan, and equalization control inputs.

8. The method of claim 1, wherein the aircraft component is at least one of:  
an airframe, an engine, a flap, a brake, a gear, a pump, and a cockpit.

9. The method of claim 1, further comprising:

5           detecting an aircraft operation; and  
          adding synthesized sounds to the audio inputs, wherein the synthesized  
sounds correspond to the detected aircraft operation.

10          10. The method of claim 9, wherein the aircraft operation comprises at least one  
of:

          a hydraulic operation, an electrical system operation, an aircraft control  
operation, and a fuel transfer operation.

11. The method of claim 1, further comprising:

15           canceling noise from the audio inputs.

12. An aircraft, comprising:

          an airframe;  
          at least one aircraft component coupled to the airframe; and  
20          an audio feedback system, comprising:  
          a plurality of microphones disposed adjacent to the at least one  
aircraft component,  
          an analysis system that  
          receives audio inputs from the microphones, and  
25           provides settings to an automatic mixer that mixes  
          the audio inputs, wherein the recommended settings are  
          based on the audio inputs and a psycho-acoustic model.

13. The aircraft of claim 12, wherein the analysis system further:  
30           determines masked signals based on the frequency and amplitude of the  
audio inputs and the psycho-acoustic model;

determines an unmasking strategy based on the masked signals; and  
provides the settings to the automatic mixer based on the unmasking  
strategy.

5        14. The aircraft of claim 12, wherein the automatic mixer:  
             mixes the audio inputs based on the settings; and  
             provides the mixed audio inputs to a speaker.

15. The aircraft of claim 14, wherein the speaker is an ambient speaker.

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16. The aircraft of claim 14, wherein the speaker is contained in a headset.

17. The aircraft of claim 12, wherein the settings comprise:  
             at least one of level, pan, and equalization settings.

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18. The aircraft of claim 12, wherein the audio feedback system further  
comprises:

             a manual mixer comprising level, pan, and equalization control inputs,  
wherein the manual mixer overrides the automatic mixer.

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19. The aircraft of claim 12, wherein the aircraft component is one of:  
             the airframe, an engine, a flap, a brake, a gear, a pump, and a cockpit.

20. The aircraft of claim 12, wherein the aircraft component is coupled directly to  
the airframe.

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21. The aircraft of claim 12, wherein the aircraft component is coupled indirectly  
to the airframe.

30        22. The aircraft of claim 12, wherein the analysis system further:  
             detects an aircraft operation; and

adds synthesized sounds to the audio inputs, wherein the synthesized sounds correspond to the detected aircraft operation.

23. The aircraft of claim 22 wherein the aircraft operation comprises at least one of:

a hydraulic operation, an electrical system operation, an aircraft control operation, and a fuel transfer operation.

24. An audio feedback system, comprising:

at least one microphone for receiving sounds from at least one sound source; and

an analysis system that

receives audio inputs from the microphone, and

provides settings to an automatic mixer that mixes the audio

inputs, wherein the recommended settings are based on the audio inputs and a psycho-acoustic model.

25. The audio feedback system of claim 24, wherein the analysis system further:

determines masked signals based on the frequency and amplitude of the audio inputs and the psycho-acoustic model;

determines an unmasking strategy based on the masked signals; and provides the settings to the automatic mixer based on the unmasking strategy.

26. The audio feedback system of claim 25, wherein the automatic mixer:

mixes the audio inputs based on the settings; and

provides the mixed audio inputs to a speaker.

27. The audio feedback system of claim 26, wherein the speaker is an ambient speaker.

28. The audio feedback system of claim 26, wherein the speaker is contained in a headset.

29. The audio feedback system of claim 24, wherein the settings comprise:  
5                   at least one of level, pan, and equalization settings.

30. The audio feedback system of claim 25 further comprising:  
                  a manual mixer comprising level, pan, and equalization control inputs,  
wherein the manual mixer overrides the automatic mixer.

31. The audio feedback system of claim 25, wherein the sound source is at least  
10                   one aircraft component.

32. The audio feedback system of claim 31, wherein the aircraft component is at  
15                   least one of:  
                  an airframe, an engine, a flap, a brake, a gear, a pump, and a cockpit.

33. The audio feedback system of claim 24, wherein the analysis system further:  
                  detects aircraft operations; and  
20                   adds synthesized sounds to the audio inputs, wherein the synthesized  
sounds correspond to the detected aircraft operations.

34. The audio feedback system of claim 33 wherein the aircraft operations  
comprise at least one of:  
25                   hydraulic operations, electrical system operations, aircraft control  
operations, and fuel transfer operations.